

TD
885.5
F57
M35
MOE

PHYTOTOXICOLOGY INVESTIGATION
IN THE VICINITY OF
HAMILTON BRICK
HAMILTON, ONTARIO
SEPTEMBER 10, 1987

OCTOBER 1989



Environment
Ontario

Jim Bradley
Minister

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca

PHYTOTOXICOLOGY INVESTIGATION IN THE VICINITY
OF HAMILTON BRICK, HAMILTON, ONTARIO
SEPTEMBER 10, 1987

ARB-169-88-Phyto

Report Prepared by:
W.D. McIlveen

Phytotoxicology Section
Air Resources Branch

OCTOBER 1989



Copyright: Queen's Printer for Ontario, 1989
This publication may be reproduced for non-commercial purposes
with appropriate attribution.

AAZN

TD1885.8/F57/M35/MDE

INTRODUCTION

In September 1986, staff from the Phytotoxicology Section, Air Resources Branch, Ontario Ministry of the Environment conducted a survey of the condition of vegetation growing in the vicinity of Hamilton Brick in Hamilton, Ontario. The foliage of sensitive plant species in close proximity to the brick plant was found to have symptoms typical of fluoride injury. Samples collected at that time confirmed that elevated concentrations of fluoride were present in the tissues of foliage. In 1987, the survey was repeated and the results of that survey are presented in this report.

FIELD INSPECTION

During the 1986 inspection, a set of 11 permanent sample stations was established for observation and collection of foliage samples. These stations are located as follows with respect to the kilns at Hamilton Brick and are shown in Figure 1.

Station	Location	Position
1	Lawrence & Rosslyn	50 m N
2	Rosedale Lawn Bowling	550 m NNW
3	Maplewood & Gage	900 m NNW
4	Rosslyn & Montclair	350 m N
5	Kensington & Central	500 m N
6	Maple & Kensington	700 m N
7	Balmoral & Lawrence	100 m E
8	Ottawa & Justine	320 m E
9	Justine & Province	600 m E
10	Lawrence & London	350 m ESE
11	Lawrence & Province	600 m ESE

The stations noted above fall within a zone bounded roughly by Lawrence Avenue on the south, by Gage Street on the west, by King Street on the north and Graham Street on the east. The area encompasses Gage Park and a residential area of approximately the same area. The south limit was largely determined by the steep slope of the Niagara Escarpment.

At each station, injury to vegetation was assessed for typical fluoride injury. Samples of foliage of silver maple (Acer saccharinum) were collected at each station except Station 1 where this species was not available. Samples of foliage from Manitoba maple (Acer negundo) and Norway maple (Acer platanoides) were taken at Station 1.

LABORATORY STUDIES

The samples were brought to the Phytotoxicology Laboratory for processing. The samples were dried in an oven, ground in a Wiley mill and stored in glass bottles. They were then forwarded to the Ministry of the Environment Laboratory, Downsview, for chemical analysis to determine the fluoride concentration.

RESULTS

Injury assessments for 1987 are included in Table 1. In general, the injury observed was similar in appearance to that in 1986 and was more severe in close proximity to the brick kilns.

The chemical analysis results for both 1986 and 1987 are presented in Table 1. The results for 1987 are very similar to those of 1986 where direct species comparisons are possible. All samples except that collected at Station 3 contained fluoride in concentrations in excess of normal background (<20 ug F/g dry tissue) levels and the Phytotoxicology Upper Limit of Normal for an urban area (35 ugF/g). The highest concentrations were measured in samples at Stations 1 and 7 which are located nearest to the brickyard. Contamination extended outside the brickyard approximately 700 m to the north and east.

SUMMARY

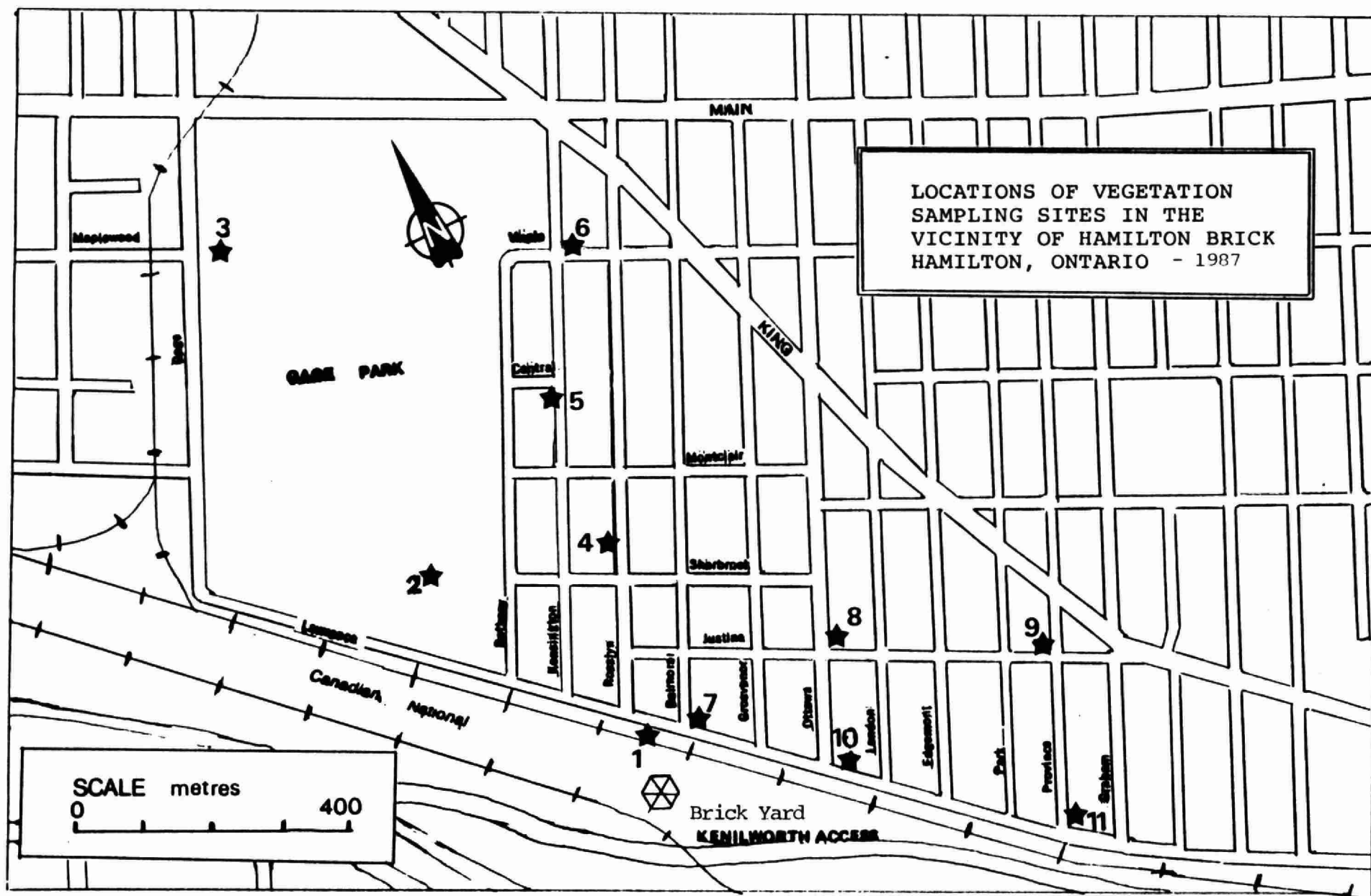
A surveillance investigation of the vegetation growing in the vicinity of the Hamilton Brick operation on Lawrence Avenue in Hamilton was conducted by the Phytotoxicology Section on September 10, 1987. Injury to sensitive vegetation was observed in close proximity to the operation and was associated with elevated fluoride content of the foliage. The maximum fluoride concentration measured was 1100 ug F/ g (dry weight basis) in the foliage. Foliar contamination and associated injury development was confirmed in an area extending apporximatley 700 m to the north and east of the brickworks.

Table 1. Fluoride content and injury to foliage samples collected in vicinity of Hamilton Brick, Hamilton, Ontario September 10, 1987

Station	Species	Fluoride 1986	Content * 1987	1987 Injury Severity	**
1	Manitoba Maple	---	1100	Severe	
1	Norway Maple	---	540	Light-moderate	
1	American Elm	400	---	Moderate-severe	
1	Chokecherry	820	---	Moderate	
1	Dogwood	---	---	Moderate	
1	Wild Grape	180	---	Moderate	
2	Silver Maple	40	44	Trace-light	
3	Silver Maple	17	20	Healthy	
4	Silver Maple	105	100	Trace	
5	Silver Maple	55	86	Trace	
6	Silver Maple	40	36	Trace	
7	Silver Maple	820	600	Light	
8	Silver Maple	54	110	Light-moderate	
9	Silver Maple	41	73	Trace	
10	Silver Maple	180	200	Moderate	
11	Silver Maple	53	56	Trace	

* ugF/g dry weight basis in unwashed foliage

** Injury Severity
Trace >0-1%
Light 2-10%
Moderate 11-35%
Severe >35%



LABORATORY LIBRARY



96936000119412

DATE DUE		

LABORATORY LIBRARY
MINISTRY OF THE ENVIRONMENT